

TABLE I
DIFFERENTIATION BETWEEN 3 SPECIES OF *Cinnamomum*

Characters	<i>C. filipedicellatum</i>	<i>C. travancoricum</i>	<i>C. chemungianum</i>
<i>Leaves:</i>			
size	4-5.5 by 8-13 cm	2-6 by 3.5-8 cm	3-7 by 2-4 cm
shape	linear-lanceolate	elliptic to subovate	ovate
apex	obscurely acuminate	obscurely acuminate	caudate acuminate
base	acute	acute	rounded
vestiture	glabrous (microscopically hairy when young)	densely appressed pilose beneath	sparsely appressed pilose beneath
<i>Inflorescence:</i>			
size	panicles up to 10 cm long	racemes up to 3 cm long	panicles up to 4 cm long
vestiture	glabrous (minutely puberulous at nodes)	appressed pubescent	glabrous
peduncle	up to 3 cm long	up to 1 cm long	up to 2 cm long
pedicel	5-15 mm long	1-3 mm long	4-6 mm long
<i>Flowers:</i>			
size	2-2.5 mm long	2.5-3 mm long	1-1.2 cm long
perianth lobes	up to 2 mm long	up to 4 mm long	up to 1.5 mm long

smooth and glossy above, sparsely appressed pilose beneath when young, ovate, caudate acuminate at apex with 1-2 cm long acumens, rounded at base; lateral nerves reaching 3/4 of the length; petioles 0.6-1 cm long, glabrous, concave above. Inflorescence a much reduced panicle, up to 4 cm long, glabrous, axillary or pseudoterminal; peduncles 1.5-2 cm long, glabrous; pedicels 4-6 mm long. Flowers 1-1.2 cm long. Perianth lobes 6 in two whorls of 3 each, c. 1.5 mm long, appressed pilose, red, ovate, acute at apex; tube c. 3 mm long, pilose. Stamens many in 3 rows, c. 1.5 mm long; anthers truncate, 4-loculed, glandular; filaments villous; staminodes c. 0.5 mm long, ovate, acute. Ovary c. 2 by 1.5 mm, subglobular, 1-ovuled; styles 1 mm long; stigmas faintly 3-lobed. Berries c. 1.4 by 1 cm, ellipsoid.

Holotype M. Mohanan 61830 (CAL) and isotypes M. Mohanan 61830 (MH Acc. No. 136396-97) were collected from Chemungi, Thiruvanan-

thapuram dt., Kerala (alt. c. 1450 m) on 19 May 1979.

This rare plant grows in the dense forests along the slopes of Chemungi.

Flowering and fruiting: December-March.

This species is closer to *C. filipedicellatum* Kosterm. but differs from it by the smaller ovate leaves rounded at base and minutely pilose beneath, shorter panicles, peduncles and pedicels, and larger flowers. It is also nearer to *C. travancoricum* Gamble but differs by the smaller, microscopically pilose (densely pubescent in *C. travancoricum*), ovate leaves with rounded base; glabrous panicles (densely pubescent racemes in *C. travancoricum*); and shorter perianth lobes. The differentiation among these three species is shown in Table 1.

We are thankful to Dr V.J. Nair, Scientist SD, Botanical Survey of India, Coimbatore for rendering the Latin translation.

A NEW SPECIES OF *THRAULUS* (EPHEMEROPTERA: LEPTOPHLEBIIDAE: ATOLOPHLEBIINAE) FROM NILGIRIS, SOUTH INDIA¹

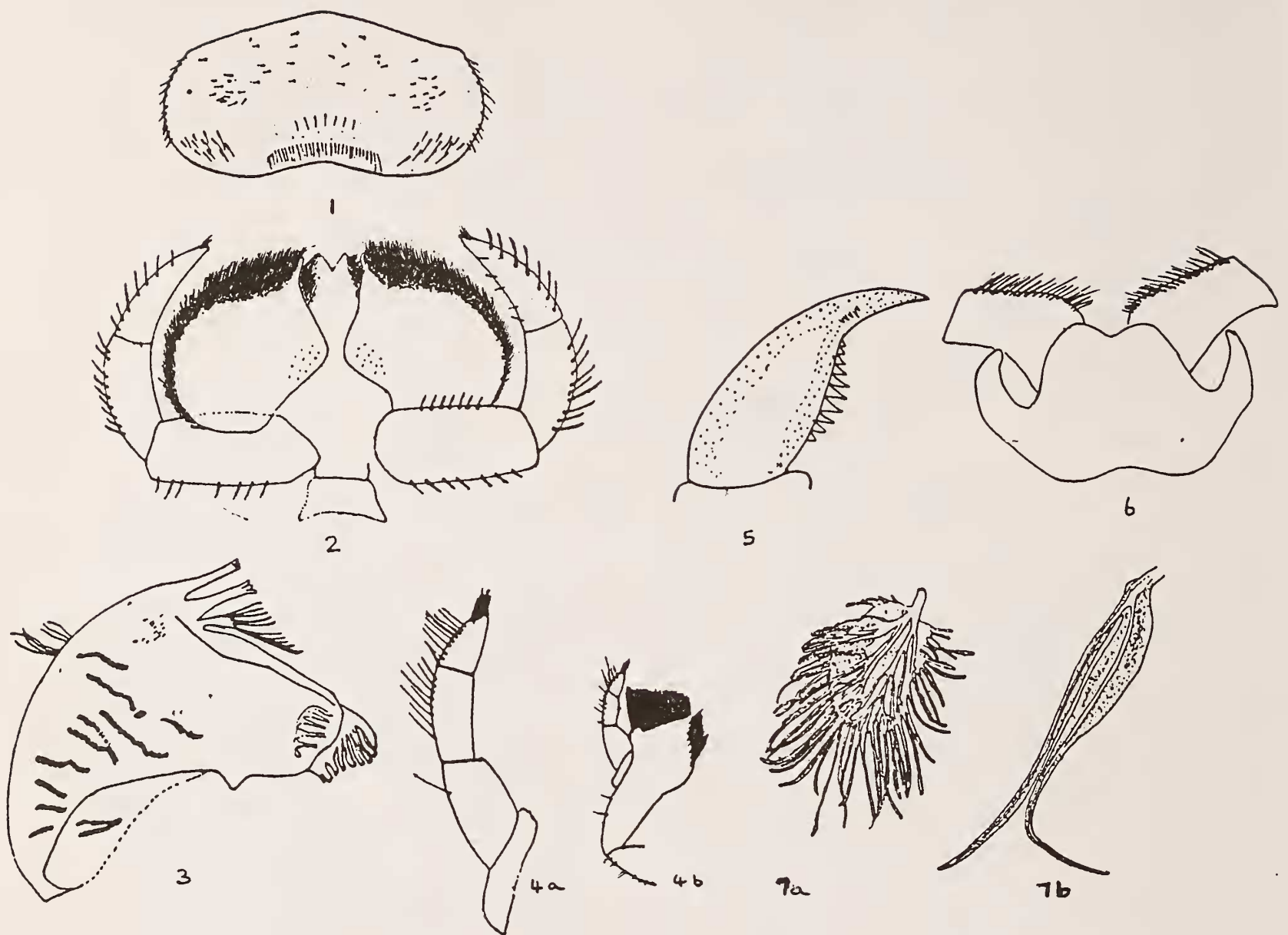
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(With seven text-figures)

Thraulius mudumalaiensis, sp. nov. is described from the collections made in Nilgiris, south India. Descriptions are provided for a female nymph.

¹Accepted February 1989.

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Eaton in 1881 established the genus *Thraulius* for the species *Thraulius bellus*, followed by *T. turbinatus* (Ulmer 1909), *T. semicastaneous* (Gillies



Figs. 1-7. *Thraulius mudumalaiensis* sp. nov. (female)

1. Labrum, 2. Labium (dorsal and ventral), 3. Mandible, 4 a. Max. Palpi (magnified), 4 b. Maxilla, 5. Claw of foreleg, 6. Hyphopharynx, 7 a. 4th gill, 7 b. 1st gill.

1951), *T. faciatus* (Kimmins 1956), *T. torrentis* (Gillies 1964), *T. bishobi* Peters and Tsui 1972, *T. demoulini* Peters and Tsui 1972, *T. mariae* Peters and Tsui 1972, *T. hsui* Peters and Tsui, 1972, *T. gopalani* Grant and Sivaramakrishnan 1985 and now *T. mudumalaiensis* sp. nov. which has been from Nilgiris, South India.

Thraulius mudumalaiensis sp. nov. (Figs. 1-7)

Female nymph (in alcohol). Body length 6.3 mm, head width 1.3 mm.

Head (Figs. 1-4 and 6): Prognathus, pale, washed evenly between eyes, ocelli and antennal sockets. Eyes dark purplish, nearly black, subtriangulate, separated from one another by 4.3 times the width of an eye. Antennae pale with scape, pedicle, flagellum. Mouth parts (Figs. 1-4, 6): Labrum (Fig. 1) with smoothly curved emargination, without denticles, width 2.0 times the length. Two rows of dorsal setae not parallel; inner row short and more or less straight and outer row curved outwards and an irregular intermittent row of setae seen in between them

ventrally. Group of setae on either of anteriolateral side of labrum. Mandibles (Fig. 3) lateral margin arcuate, smoothly rounded, with a short row of hairs about 7 in number in between the distance of 0.6 to 0.78 (Ca.)³ from basal. Prosthecal tuft with 14 stiff hairs on left mandible, 9 in right. Incisors unserrated, end in trident structure. Hyphopharynx (Fig. 6) Lingua, snow-white in color with well developed lateral processes, apex of submedian lobe notched, superlingua brownish yellow with a row of hairs along the anterior margin. Maxillae (Fig. 4a, 4b) galea and lacinia narrow at apex. Segmental lengths of 1st, 2nd and 3rd are 17, 17 and 12.5 (Ca) respectively. Segment 2 of maxillary palpi is almost equal to the length of segment 1 and segment 3 of the maxillary palpi is 0.74 the length of segment 2. Widths of the apical and subapical rows are 0.88 and 0.65 respectively to the width of galealacinia. Labium (Fig. 2): mesal region of the paraglossa and inner lateral side of the glossa snow-white in colour. Anterior side of the glossa and paraglossa light yellowish brown. Segments of labial palpi 1st, 2nd and 3rd are 28, 20, 23 (Ca.) respectively. Segment 2 of the labial palpi 0.7 the length of segment 1, and segment 3 of the palpi a little longer than segment 2.

Thorax: Pronotum, anterior margin curved. Pronotum, mesonotum, metanotum, intercoxal area, sterna, pleura are generally washed with testaceous. Basal area of forewing yellow with a little tinge of brown. Coastal area of forewings hyaline. Middle leg coxae, with brown shading, trochanter with a few spines. Inner side of the femora not angulate, tibia with prominent bristles on outer side and improminent spines throughout the length of inner side, which are subequal in length. Claw of foreleg (Fig. 5) tip dull reddish brown and mesal region greenish yellow in colour with 10 basal denticles increasing medially and decreasing apically and subapical row with 5 minute denticles.

Abdomen: Brownish yellow in colour, 1-6 of the terga with pale mesal line. 10th segment light ochraceous, 9th tergite's lateral side with dull brown band. Lateral sides of terga and spiracular area pale in colour, posterolateral projections in 8th and 9th segments light ochraceous and acuminate. Gills (Fig. 7a, b) yellow with little tinge of brown, veins clear, 1-7 dissimilar, gill 1 dorsal lanceolate and

ventral slender. 2-7 gills (Fig. 7a) dorsal elliptical and ventral oval shaped with entire margin fringed, length of the fimbriae increased apically. Caudal filaments, terminal slightly longer than the cerci.

Thraululus mudumalaiensis can be distinguished from all other known described species by the following combination of characters in the nymph 1) claws (Fig. 5) with 5 minute denticles in apical set and 10 larger denticles in basal row in which the size increases medially, then decreases apically. 2) labrum (Fig. 1) without denticles in the emargination and has 2 rows of setae on dorsal side and an irregular intermittent setae ventrally in between the 2 dorsal rows, a cluster of setae of either of the anterolateral side of its venter. 3) coastal area of forewing pads hyaline, without longitudinal brown streak. 4) mandibles (Fig. 3) with lateral sides smoothly rounded with some setae on mid region. 5) maxillary palp (Fig. 4a) has 2nd segment almost equal to the length of segment 1, segment 3, 0.74 the length of segment 2. 6) labial segment (Fig. 2) segment 2 is 0.7 the length of segment 1 and segment 3 a little longer than segment 2.

Thraululus mudumalaiensis is closely allied to *Thraululus bishopi* in the following characters. Gill 1-7 dissimilar, gill 1 (Fig. 7b) dorsal lanceolate and ventral slender. Gills 2-7 (Fig. 7a) dorsal ovate with entire margin fringed and absence of macula on 2-9 sterna. Setae on middle tibia subequal in length. Abdominal terga 8-9 with posterolateral spines, claws with apical — most denticles of subapical row not disproportionately large.

Distribution: *Thraululus mudumalaiensis* is known only from Nilgiris, Tamil Nadu.

Biology: It was found on a small sized slightly algal coated stone which was crawling with nymphs of *Chorotrepes* sp., *Baetis* sp. Heptageniidae and Caenidae of Ephemeroptera, and nymphs of Trichoptera and Plecoptera at a depth of 15 cm in the middle of a slow moving clear stream.

Etymology: This species is named after the place where it was collected first.

Type data: Female nymph, with abdomen and part of thorax in alcohol and mouth parts, legs, gills in slides with following label. Holotype: INDIA: Nilgiris, Mudumalai, 950 m, 2 IV 88, with slide numbers A.K.A 1-15, Reg. No. I.E.1a-p., which have been deposited in the Zoological Survey of India, Madras, Tamil Nadu.

³Ca. = Calibration

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